MMX6464

PTN Modular Matrix Switcher 64x64

Version: MMX6464_2015V2.2

PTN **www.PTN-electronics.com**

Preface

Read this user manual carefully before using this product. Pictures shown in this manual is for reference only, different model and specifications are subject to real product.

This manual is only for operation instruction only, not for any maintenance usage. The functions described in this version are updated till March 2015. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

All product function is valid till 2015-3-13.

Trademarks

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FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.

SAFETY PRECAUTIONS

To insure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment

- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.

- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.

- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.

- Refer all servicing to qualified service personnel.

- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

- Do not put any heavy items on the extension cable in case of extrusion.

- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.

- Install the device in a place with fine ventilation to avoid damage caused by overheat.

- Keep the module away from liquids.

- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.

- Do not twist or pull by force ends of the optical cable. It can cause malfunction.

- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

- Unplug the power cord when left unused for a long period of time.

- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

Table of Contents

1. Introduction

1.1. About MMX6464

MMX6464 is a high-performance video and audio modular matrix switcher supporting max 64 input signal sources and 64 output display synchronously. It supports different video signals with cross switching. Every video or audio signal is transmitted and switched independently to decrease signal attenuation. MMX6464 supports various changeable cards including HMDI, DVI, VGA, SDI and HDBaseT etc, and all the cards support hot plug & play. Users can choose to insert different signal card for different application.

MMX6464 have power fail memory function and audio can break away from or follow the video to switch. It has RS232 port for serial control and optional IP port for TCP/IP control, can be easily controlled by third-part devices.

With its flexible design, MMX6464 can be used for different project and tend to be an all-in-one solution. It is the combo solution for multimedia conference rooms, control rooms, broadcasting rooms, shopping center etc. It will handle all the audiovisual management, including the switching, driving, scaling etc.

1.2. Features

- Modular chassis with configurable I/O slots, ranging from 4x4 to 64x64.
- Various I/O cards, includes HDMI, HDBaseT, SD/HD/3G-SDI, DVI and VGA cards (Compatible with YUV, YC & CVBS.) to configure any matrix.
- Truly cross-point switching, any input to any output, regardless signal format.
- Support HDMI1.4a, support 3D.
- Integrated HDBaseT technology.
- Controllable via button, RS232 & optional TCP/IP, also compatible with 3rd parties control.
- HDCP compliant.
- LCD display.

1.2.1. MMX signal card (changeable cards)

To meet different situation and users, the MMX6464 cards are classified into the following models:

Models \ Spec	Inputs	Signal Format
4I-HD	4	HDMI
4I-DV	4	DVI
4I-DS	4	DVI, HDMI, VGA, AV, YPbPr
4I-VG	4	VGA
4I-VA	4	VGA& PCM audio

Input Cards

Spec Models	Inputs	Signal Format
4I-SD	4 inputs & 4 LOOP outputs for each channel)	SDI
4I-TP	4	HDMI TP, IR, RS232
4I-UH	4	HDMI& PCM Audio
4I-UF	4	Optical Fiber
4I-BT	4	HDBT, RS232, Audio

Input Cards

Spec Models	Outputs	Signal Format
4O-HD	4	HDMI
4O-DV	4	DVI
4O-DS	4	DVI, HDMI, VGA, AV, YPbPr
4O-VG	4 VGA, 4 Stereo audio	VGA, analog audio
4O-SD	4 outputs & 4 LOOP outputs for each channel)	SDI
4O-TP	4	HDMI TP, IR, RS232
4O-UH	4	HDMI& PCM Audio
4O-UF	4	Optical Fiber
4O-BT	4	HDBT, RS232, Audio

1.4 Package List

- 1 x MMX6464
- 1 x RS232 cable
- 4 x Plastic cushions
- 1 x IR remote (The cell battery is not included)
- 1 x Power Cord
- 4 x Male VGA to female YPbPr cable (packed only when includes the 4I-VG/4I-VA cards)
- 4 x Male VGA to female S-video & RCA (C-video) cable (packed only when includes the 4I-VG/4I-VA cards)
- 1 x User manual

Notes：Please confirm if the product and the accessories are all included, if not, please contact with the dealers.

2. Panel Description

2.1. MMX6464

2.1.1. Front Panel
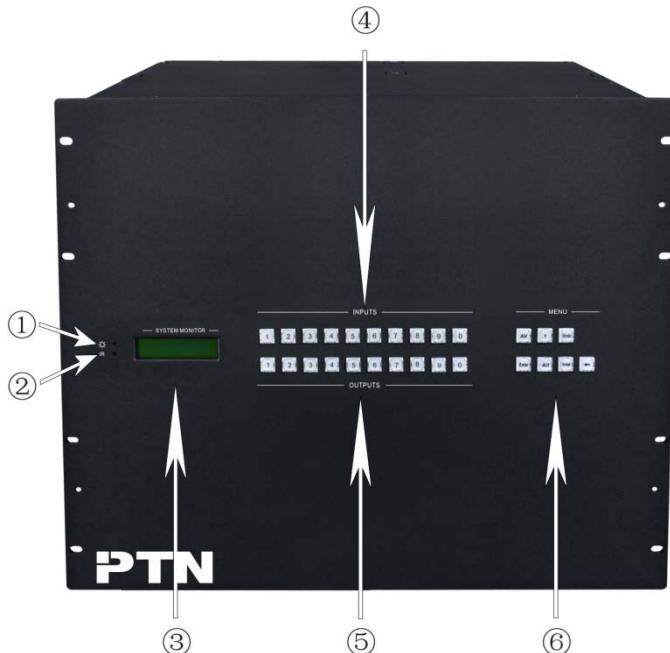
Figure 2- 1 Front Panel of MMX6464

No.	Name	Description
①	IR	IR sensor, receive IR signal sent from IR remote
②	Power indicator	Illuminate red once powered on
③	LCD screen	Display real-time operation status
④	INPUTS	Buttons for input channels with green back-light indicating, ranges from 0~ 9, 64 selectable channels in total.
⑤	OUTPUTS	Buttons for output channels with green back-light indicating, ranges from 0 ~ 9, 64 selectable channels in total.
⑥	MENU	**AV**: transfer video and audio signal synchronously
		,: division button, to divide the output channels when switching to more than one channel.

		ENTER: confirm switching operation. Operation will not be executed by the matrix without confirmation.
		ALL: To transfer an input channel to all output channels.
		THROUGH: To transfer the signals directly to the corresponding output channels.
		UNDO: Undo button, to resume to the status before the command just performed.
		←: Backspace button, to backspace the latest input button.

2.1.2. Rear Panel
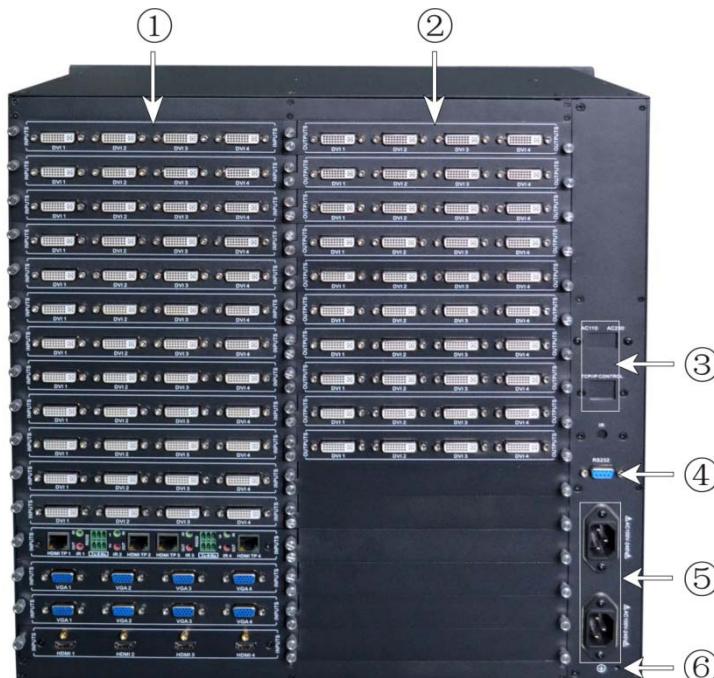
Figure 2- 2 Rear Panel of MMX6464

No.	Name	Description
①	INPUTS	Input signal card slots, 16 in total
②	OUTPUTS	Output signal card slots, 16 in total
③	Optional Ports	Power switch: Switch between AC110V and AC230V to access different power supply

		TCP/IP: Used for TCP/IP control port
④	RS232	Serial control port, connect with RS232 port of control device.
⑤	Power ports	Connect with household alternating current power, including one redundant power.
⑥	GND connector	Used for system grounding

Note: There are only 16 input and 16 output slots for MMX6464, which enables only 16 input cards and 16 output cards to be installed on MMX6464. The input/output cards can be changed based on your requests and supports hot plug and play.

2.2. Changeable Cards

MMX6464 support expansion through various changeable input/ output cards of different signals including DVI, HDMI, VGA, twisted pair, SDI etc. Here is a brief introduction to the changeable cards.

2.2.1. 4I-DV & 4O-DV

DVI signal card. (Please check the specification from 5.*2.1*)
It is fully compatible with HDMI1.3 and HDCP, but not supporting analogy signal.
It is embedded EDID management technology, supporting DDC.
4I-DV: input card, maximum four input signal. Input signal can pass to output device through 4O-DV, or pass through other kinds of output cards.

4O-DV: output card, maximum four output signal, output signals from 4I-DV, or other kinds of input cards.

Pin Layout of the DVI-I connector (Dual-Link). (Female)
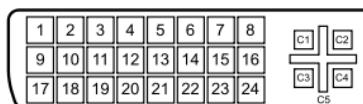
PIN	Function	PIN	Function
1	T.M.D.S.Data2-	13	T.M.D.S.Data3+
2	T.M.D.S.Data2+	14	+5V Power
3	T.M.D.S. Data 2/4 Shield	15	Ground (return for +5V, Hsync and Vsync)

| 4	T.M.D.S. Data 4-	16	Hot Plug Detect
5	T.M.D.S. Data 4+	17	T.M.D.S. Data 0-
6	DDC Clock	18	T.M.D.S. Data 0+
7	DDC Data	19	T.M.D.S. Data 0/5 Shield
8	Analog Vertical Sync	20	T.M.D.S.Data5-
9	T.M.D.S.Data1-	21	T.M.D.S.Data5+
10	T.M.D.S.Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S.Data1/3 Shield	23	T.M.D. S. Clock +
12	T.M.D.S.Data3-	24	T.M.D.S .Clock-

2.2.2. 4I-DS& 4O-DS

Seamless DVI signal card. (*Please check the specification from 5.2.2*)

It is fully compatible with HDMI1.3 and HDCP 1.2, and supports seamless transmission for high-definition DVI, HDMI, VGA, AV, YPbPr signals. It can automatically identify the format of input signal, and the output resolution can be adjusted.

It is embedded the EDID management technology, supporting DDC.

4I-DS: seamless input card, maximum four input signal. Input signal can pass to output device through 4O-DS, or pass through other kinds of output cards.

4O-DS: seamless output card, maximum four output signal. Output signal can come from 4I-DS, or from other kinds of input cards. It supports off memory for resolution, signal format, HDCP compliant status.

Note: When 4O-DS works with input cards except 4I-DS, adjust the 4 input signals to any one of the following 5 resolutions to enable seamless output: 1024x768, 1280x720, 1600x1200, 1920x1080, 1920x1200.
DVI interfaces on the signal card are same with the interfaces on 4I-DV& 4O-DV.

2.2.3. 4I-HD & 4O-HD

HDMI signal card. (Please check the specification from 5.*2.3*)
It is embedded the EDID management technology, supporting DDC.
It is also compatible with DVI signal (HDCP required).
4I-HD: input card, maximum four input signal. Input signal can pass to output device through 4O-HD, or pass through other kinds of output cards.

4O-HD: output card, maximum four output signal, output signals from 4I-HD, or other kinds of input cards.

Pin layout of the HDMI connectors (female).
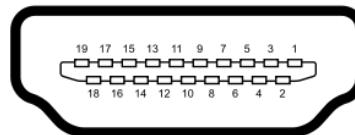
No.	Signal Name	No.	Signal Name
1	TMDS Data 2+	20	SHELL
2	TMDS Data 2 Shield	19	Hot Plug Detect
3	TMDS Data 2-	18	+5V Power
4	TMDS Data 1+	17	Ground
5	TMDS Data 1 Shield	16	DDC Data
6	TMDS Data 1-	15	DDC Clock
7	TMDS Data 0+	14	No Connect
8	TMDS Data 0 Shield	13	CEC
9	TMDS Data 0-	12	TMDS Clock-
10	TMDS Clock+	11	TMDS Clock Shield

2.2.4. 4I-VG & 4O-VG

VGA signal card. (Please check the specification from 5.2.4)
Scale all inputs to 1080p.
Compatible with C-Video, YUV, YC (Factory preset function).
The bandwidth is up to 350MHz (-3dB);
Supporting RGBHV, RGsB, RGBS, RsGsBs, YUV, YC and Composite video.
4I-VG: input card, maximum four input signal. Input signal can pass to output device through any kinds of output cards.

4O-VG: output card, maximum four VGA output signal and 4 stereo audio outputs, output video signal from 4I-VG, or other kinds of input cards, and output audio signal

from the audio of the input signal.

Pin layout of the VGA connectors (female):
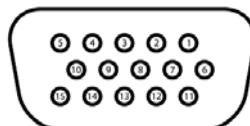
Pin Number	Signal Name	Pin Number	Signal Name
Pin 1	RED	Pin 9	KEY/PWR
Pin 2	GREEN	Pin 10	GND
Pin 3	BLUE	Pin 11	ID0/RES
Pin 4	ID2/RES	Pin 12	ID1/SDA
Pin 5	GND	Pin 13	HSync
Pin 6	RED_RTN	Pin 14	VSync
Pin 7	GREEN_RTN	Pin 15	ID3/SCL
Pin 8	BLUE_RTN		

Connect the devices via VGA converting cable as shown below:

● **Connect with Component Video (YPbPr) Source**
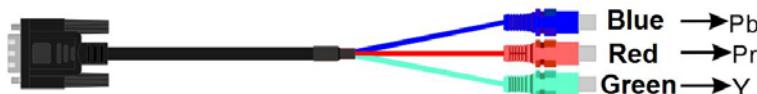
● **Connect with Composite Video (C-VIDEO) Source**
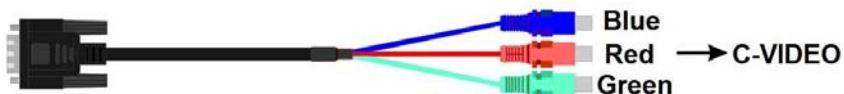
2.2.5. 4I-VA

VGA signal card. (*Please check the specification from 5.2.5*)
Scale all inputs to 1080p.
Compatible with C-Video, YUV, YC (Factory preset function).
Supporting RGBHV, RGsB, RGBS, RsGsBs, YUV, YC and Composite video.

4I-VA: input card, maximum four VGA inputs and four stereo audio inputs. Input signal

can pass to output device through any kinds of output cards.
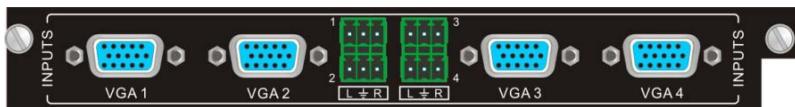
The VGA connector and source connection is same with the 4I-VG.

2.2.6. 4I-SD & 4O-SD

SDI signal card. (Please check the specification from 5.2.6)
It is compatible with different SDI signal formats, including SD/HD/3G-SDI (adaptive)
Every port has loop output for local monitoring.
4I-SD: input card, maximum four input signal. Input signal can pass to output device through 4O-SD, or pass through other kinds of output cards.

4O-SD: output card, maximum four output signal, output signals from 4I-SD, or other kinds of input cards.
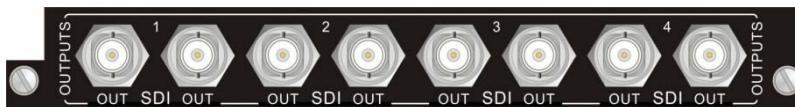
The BNC connector is shown as the figure below.
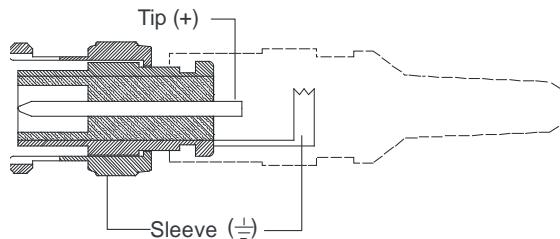
BNC Connector

2.2.7. 4I-TP & 4O-TP

Twisted pair card (HDMI/DVI extender). (Please check the specification from 5.2.7)
Support HDTV, compatible with HDMI1.3 and HDCP
4I-TP: input card, maximum input four HDMI TP signal. Input signal can pass to output device through 4O-TP, or pass through other kinds of output cards, need to work with TPHD402T.
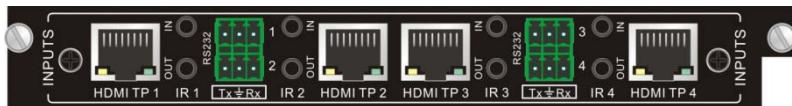
4O-TP: output card, maximum output four HDMI TP signal, output signals from 4I-TP, or other kinds of input cards, need to work with TPHD402R.
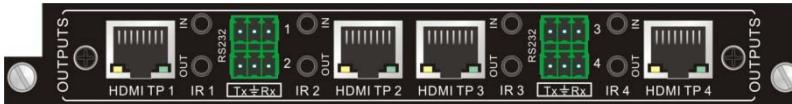
Pin layout of the RJ45 connectors:

Two different connection standards can be chose; the connectors of same cable should use the same standard.

TIA/EIA T568A			TIA/EIA T568B	
	Cable color			Cable color
1	green white		1	orange white
2	green		2	orange
3	orange white		3	green white
4	blue		4	blue
5	blue white		5	blue white
6	orange		6	green
7	brown white		7	brown white
8	brown		8	brown
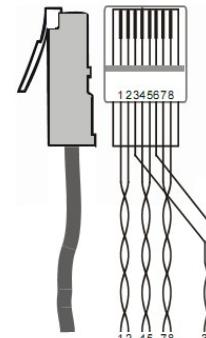
Notice: Cable connectors MUST be metal one, and the shielded layer of cable MUST be connected to the connector's metal shell, to well share the grounding.

2.2.8. 4I-UH & 4O-UH

4K HDMI signal card. (Please check the specification from *5.2.8*)
Support hot-plug, HDMI 1.4& HDCP 1.4 compliance; Compatible with DVI signal;
Support high-definition HDMI source up to 4kx2k, 1080p 3D compliance; Provide auxiliary audio port as supplement to HDMI embedded audio.
It is also embedded the EDID management technology.
4I-UH: input card, maximum four input signal. Input signal can pass to output device through 4O-UH, or pass through other kinds of output cards.

4O-UH: output card, maximum four output signal, output signals from 4I-UH, or other kinds of input cards, HDCP compliant status settable via RS232 command

2.2.9. 4I-UF & 4O-UF

4K optical signal card. (Please check the specification from 5.2.9)
Support hot-plug; High bandwidth: 10.2Gbps; Compliant with HDMI 1.4, capable to transmit 4K×2K& 1080P 3D (max) signals; Support multi-mode transmission up to 300m and single mode transmission up to 1km.
4I-UF: input card with indicators, maximum four input signal, corresponding indicator illuminates green when there is input signal. Input signal can pass to output device through 4O-UF, or pass through other kinds of output cards.
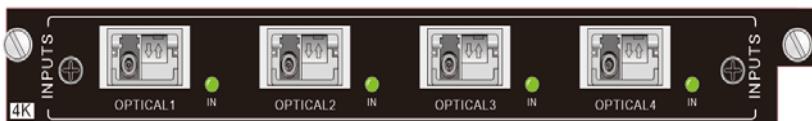
4O-UF: output card with indicators, maximum four output signal, output signals from 4I-UF, or other kinds of input cards; corresponding indicator illuminates green when there is output signal.
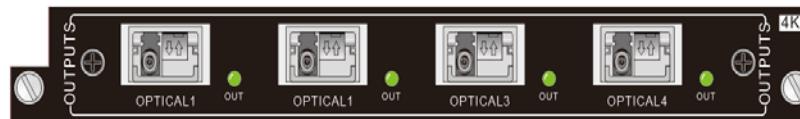
Note: Use the 4I-UF/ 4O-UF with optical fiber transmitter/ receiver.

2.2.10. 4I-BT & 4O-BT

Twisted pair card (HDMI/DVI extender). (Please check the specification from 5.2.10)
Support hot-plug, support HDTV, compatible with HDBT 1.0, HDMI1.4a& HDCP1.4; Wide resolution range from 480p to 4kx2k, 1080p 3D compliant; Extend HDBT signal up to 70m at 1080p or 40m at 4k; Bi-directional RS232 transmission on single cable; Auxiliary audio ports support stereo signal.
It is also embedded the EDID management technology.
4I-BT: input card, maximum input four HDMI TP signal. Input signal can pass to output device through 4O-BT, or pass through other kinds of output cards, need to work with HDBT transmitter (e.g. TPHD402T).
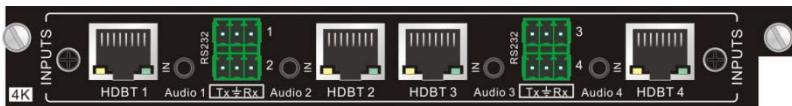
4O-BT: output card, maximum output four HDBT signal, output signals from 4I-BT, or other kinds of input cards, need to work with HDBT receiver (e.g. TPHD402R).
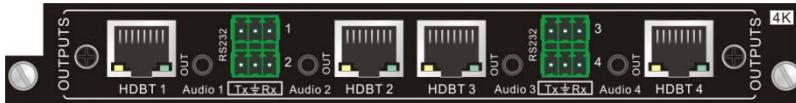
3. System Connection

3.1. Usage Precautions

1) System should be installed in a clean environment and has a prop temperature and humidity.
2) All of the power switches, plugs, sockets and power cords should be insulated and safe.
3) All devices should be connected before power on.

3.2. Connection Diagram
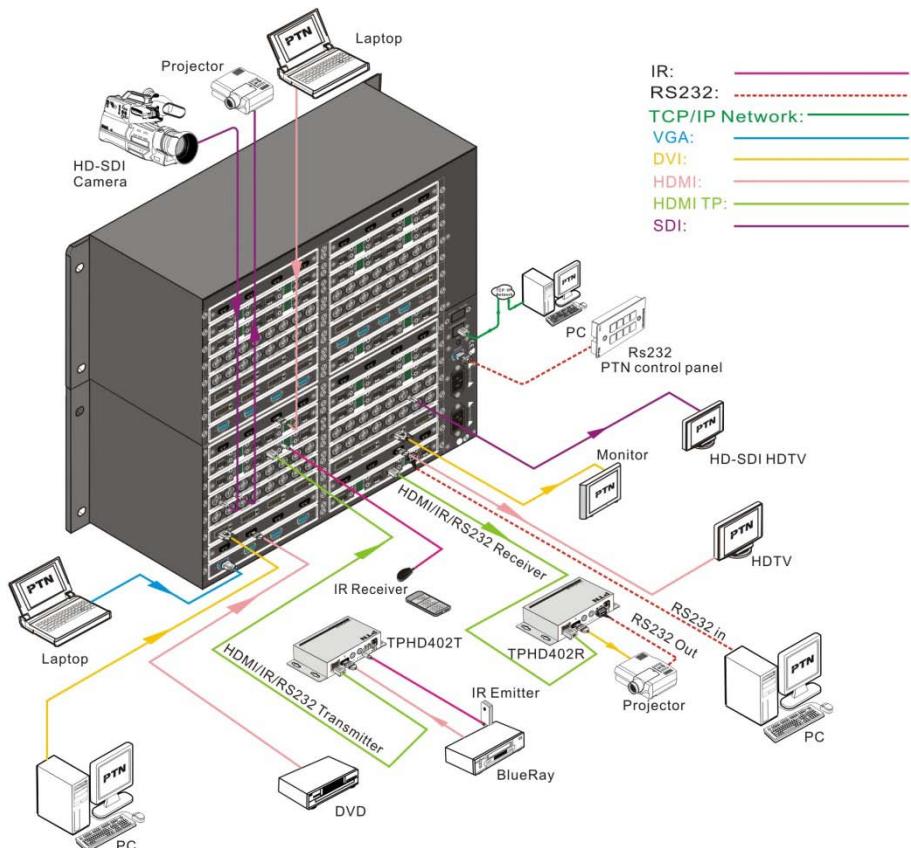
Figure 3- 1 System Diagram

3.3. Application

MMX series has a good application in various occasions, such as radio & television, multi-media meeting room, big screen displaying, television education and command & control center etc.

4. Control Operations

Users can control MMX6464 rapidly and directly with its front panel buttons. To switch AV/ A/ V signal, please operate the buttons under the following format:

Format: "**Input Channel**" + "**AV**" +"**Output Channel**"+"**Enter**"

Note:

1) "Switch Mode": Audio & Video synchronal (AV) or separate switching mode (Audio/ Video)

2) "Input Channel": Fill with the number of input channel to be controlled,

3) "Output Channel": Fill with the number of output channels to be controlled. Press "All" to select all the outputs.

4) Use "**,**" button to separate multiple I/O channels, and press "**ENTER**" button to confirm the operation.

5) The input/output channels on the rear panel are counting from left to right, top to bottom.

6) The input delay time between two numbers of every input& output channel must be less than 5 seconds; otherwise the operation will be cancelled.

Example:

1. To transfer input 1 to output 11, press input "**1**", output "**0**" "**1**" and "**Enter**".

2. To transfer signals from input 1 to all output channels, press buttons in this order: "**1**", "**All**".

Other Functional Buttons:

Buttons	Description	Operation
UNDO	return to the previous status	Status 1: Input 6 -> output 6 Press input "6" + "AV"+ output 4 to change the connection. Press "Undo" to return to Status 1.
←	Backspace the last operation	If you press buttons "1", "AV", "2", "←" in order, then "2" will be canceled.
THROUGH	Get straight I/O connection, e.g. input 1-> output 1, input 2-> output 2.	Format: "Input Channel"+"Through" If you press buttons "ALL", "THROUGH" in order, then the result will be like input 1→ output 1, input 2→output 2, input 3→output 3 … input 16→output 16.

4.1. IR Remote control

With the IR remote, MMX6464 could be controlled remotely. As the function buttons on the IR remote are the same with the ones on the front panel, the IR remote shares the same operations and commands with the control panel.

Press the buttons under below format:

"**Input Channel**" + "**Switch Mode**" +"**Output Channel**"
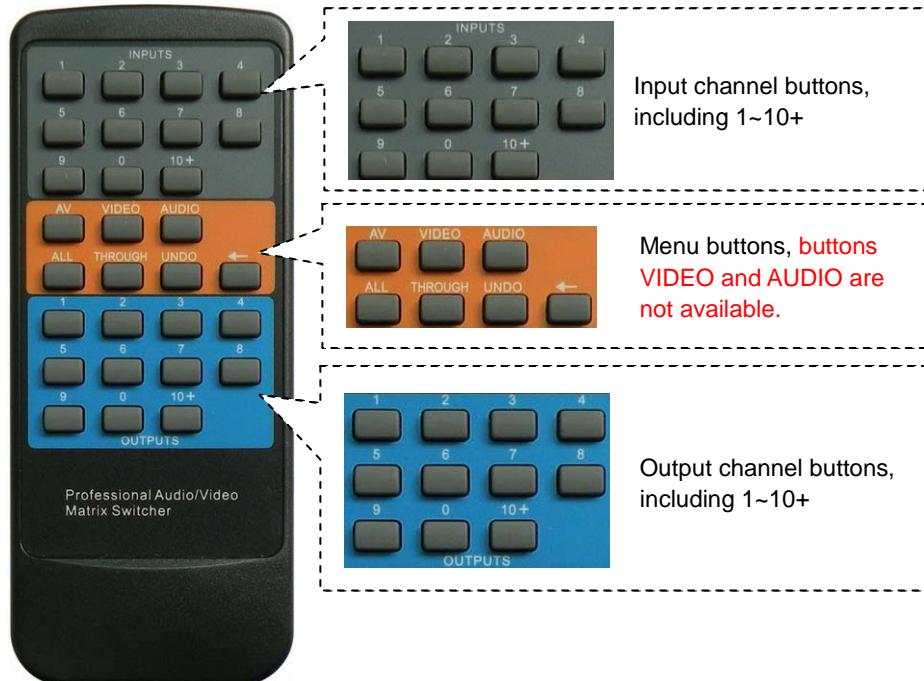
Figure 4- 1 Panel of the IR Remote

The figure shows the panel of the IR Remote with callouts:

Input channel buttons, including 1~10+

Menu buttons, buttons VIDEO and AUDIO are not available.

Output channel buttons, including 1~10+

4.2. RS232 Control

4.2.1. Connection of RS232 Communication Port

Except the front control panel and IR remote, MMX6464 can be controlled by far-end control system or through the Ethernet control via the RS-264 communication port. This RS-264 communication port is a female 9- D connector. The definition of its pin layout is shown in the table below.
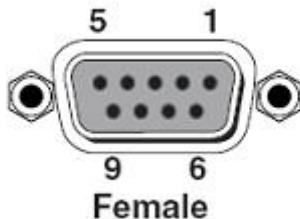
No.		Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

When MMX6464 connects to the RS232 port of a computer with control software, users can control it by that computer. To control the switcher, users need to use RS232 control software.

4.2.2. RS232 Communication Commands

With this command system, users are able to control and operate the MMX6464 with RS232 software remotely.

Communication protocol: Baud rate: 9600; Data bit: 8; Stop bit: 1; Parity bit: none.

Type	Command	Description
Commands for Main Unit	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the "switcher OK".
	/:MessageOn;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the "demo" mode, 1->1, 2->2, 3->3 … and so on.

[x]All.	Transfer signals from the input channel [x] to all output channels	
All#.	Transfer all input signals to the corresponding output channels respectively.	
All$.	Switch off all the output channels.	
[x]#.	Transfer signals from the input channel [x] to the output channel [x].	
[x]$.	Switch off the output channel [x].	
All@.	Switch on all the output.	
[x]@.	Switch on output [x].	
[x1]V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].	
[x1]A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].	
[x1]B[x2].	Transfer signal from the input channel [x1] to the output channel [x2].	
Status[x].	Inquire the input channel to the output channel [x].	
Status.	Inquire the input channel to the output channels one by one.	
Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.	
Recall[Y].	Recall the preset command [Y].	
Clear[Y].	Clear the preset command [Y].	
PWON.	Work normally.	
PWOFF.	Enter in standby mode.	
HDCPON.	Turn on the HDCP output.	
HDCPOFF.	Turn off the HDCP output.	
/V00.	Inquire the version of backboard software.	
UpgradeIntEDID[x].	Upgrade built-in EDID data. Supports 6 types of EDID data (see *Note 6*). When the switcher gets the command, it will show a message to send EDID file (.bin file).	
EDIDUpgrade[x].	Upgrade EDID data of input ports When the switcher gets the command, it will show a message to send EDID file (.bin file). Operations will be canceled after 10 seconds.	

	EDID/[x]/[y].	Set the EDID data of input port [x] to built-in EDID data of type [y]. The value of [y] varies from 1~6. The EDID data types are same as mentioned above.
	EDIDG[x].	Get EDID data from output channel X and display the data on serial port control software. [x] is the output port number.
	EDIDMInit.	Recover the factory default EDID data for every input channel.
	EDIDM[X]B[Y].	Manually EDID switching. Enable input [Y] to learn the EDID data of output[X]. If there is problem learning the EDID data, it will automatically set the default EDID data for input [Y].
	USER/[Y]/[X]:*****;	Custom command for signal cards, [Y]=I/O; [X]= port number; *****: User-definable command, e.g. 0623%
	0911%.	Restore factory default.
Commands for Signal Cards	**4I-VA**	
	USER/I/[x]:0622%;	Set the signal of input channel [x] to VGA.
	USER/I/[x]:0623%;	Set the signal of input channel [x] to YCBCR.
	USER/I/[x]:0624%;	Set the signal of input channel [x] to SVIDEO.
	USER/I/[x]:0625%;	Set the signal of input channel [x] to CVIDEO.
	USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768@60Hz.
	USER/I/[x]:0627%;	Set the resolution of input [x] to 1280X720@60Hz.
	USER/I/[x]:0628%;	Set the resolution of input [x] to 1280X800@60Hz.
	USER/I/[x]:0619%;	Set the resolution of input [x] to 1360X768@60Hz.
	USER/I/[x]:0621%;	Set the resolution of input [x] to 1600X1200@60Hz.
	USER/I/[x]:0629%;	Set the resolution of input [x] to 1920X1080@60Hz.
	USER/I/[x]:0620%;	Set the resolution of input [x] to 1920X1200@60Hz.
	USER/I/[x]:0617%;	Restore to factory default.
	USER/I/[x]:0606%;	Auto-adjust VGA signal

	USER/I/[x]:0698%;	Update software
	4I-VG	
	USER/I/[x]:0698%;	Update software
	USER/I/[x]:0622%;	Set the signal of input channel [x] to VGA.
	USER/I/[x]:0623%;	Set the signal of input channel [x] to YCBCR.
	USER/I/[x]:0624%;	Set the signal of input channel [x] to SVIDEO.
	USER/I/[x]:0625%;	Set the signal of input channel [x] to CVIDEO.
	USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768@60Hz.
	USER/I/[x]:0627%;	Set the resolution of input [x] to 1280X720@60Hz.
	USER/I/[x]:0628%;	Set the resolution of input [x] to 1280X800@60Hz.
	USER/I/[x]:0629%;	Set the resolution of input [x] to 1920X1080@60Hz.
	4I-DS	
	USER/I/[x]:02xx%;	Set the brightness of input [x] to xx, xx=00~99
	USER/I/[x]:03xx%;	Set the contrast of input [x] to xx, xx=00~99
	USER/I/[x]:04xx%;	Set the saturation of input [x] to xx, xx=00~99
	USER/I/[x]:05xx%;	Set the sharpness of input [x] to xx, xx=00~99
	USER/I/[x]:0606%;	(For 4I-DS/ VA) Auto-adjust VGA input signal
	USER/I/[x]:0607%;	Set picture's color temperature
	USER/I/[x]:0608%;	Configure image scale
	USER/I/[x]:0614%;	Configure picture mode
	USER/I/[x]:0617%;	Restore to factory default.
	USER/I/[x]:0619%;	Set the resolution of input [x] to 1360x768, HD
	USER/I/[x]:0626%;	Set the resolution of input [x] to 1024x768, XGA
	USER/I/[x]:0627%;	Set the resolution of input [x] to 1280x720, 720P
	USER/I/[x]:0628%;	Set the resolution of input [x] to 1280x800, WXGA
	USER/I/[x]:0629%;	Set the resolution of input [x] to 1920x1080, 1080P
	USER/I/[x]:0620%;	Set the resolution of input [x] to 1920x1200, WUXGA

USER/I/[x]:0621%;	Set the resolution of input [x] to 1600x1200, UXGA
USER/I/[x]:0698%;	Software update
USER/I/[x]:0686%;	Set the output signal of input [x] to HDMI
USER/I/[x]:0687%;	Set the output signal of input [x] to DVI
4O-DS	
USER/O/[x]:0201%;	Set the input source of output [x] to YPbPr
USER/O/[x]:0202%;	Set the input source of output [x] to VGA
USER/O/[x]:0203%;	Set the input source of output [x] to C-VIDEO
USER/O/[x]:0804%;	Set the resolution of output [x] to 1280x720P @60Hz
USER/O/[x]:0813%;	Set the resolution of output [x] to 1280x1080P @60Hz
USER/O/[x]:0824%;	Set the resolution of output [x] to 1024x768 @60Hz
USER/O/[x]:0826%;	Set the resolution of output [x] to 1280x1024 @60Hz
USER/O/[x]:0837%;	Set the resolution of output [x] to 1920x1200 @60Hz
USER/O/[x]:0106%;	Switch on the HDCP compliance of output [x]
USER/O/[x]:0107%;	Switch off the HDCP compliance of output [x]
GetResolution[x].	Capture output resolution of output [x]
GetVGAPortMode[x].	Inquire the output status of VGA port [x]
4I-UH/BT	
AUDIO[X]I[Z].	Select audio source from audio inputs or AV signal inputs

Note:

1. Please disconnect all the twisted pairs before sending command EDIDUpgrade[X].

2. In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.

3. Please remember to end the commands with the ending symbols "." or ";".

4. Type the command carefully, it is case-sensitive.

5. Commands pertaining to EDID only avails for signal cards that support EDID management.

6. The switcher boasts 6 in-built EDID data, the chart below illustrates the detailed information:

No.	Detailed Information
1	1080p 2D 5.1CH
2	1080p 2D 2.0CH
3	720p 2D 5.1CH
4	720p 2D 2.0CH
5	4kx2k 2D 5.1CH
6	4kx2k 2D 2.0CH

Update in-built EDID data by sending command **UpgradeIntEDID[x].**.

Examples:

1、Transfer signals from an input channel to all output channels: [x]All.

Example: Send "3All." to transfer signals from the input 3 to all output channels.

2、Transfer all input signals to corresponding output channels respectively: All#.

Example: If this command is carried out, the status of matrix will be: 1->1, 2->2, 3->3, 4->4…… 8->8….

3、Switch off all the output channels: All$.

Example: After running this command, there will be no signals on all the outputs.

4、Switch off the detail feedback command from the COM port: /:MessageOff;

But, it will leave the "switch OK" as the feedback, when you switch the matrix.

5、Switch on the detail feedback command from the COM port: /:MessageOn;

It will show the detail switch information when it switch. Example: when switch 1->2, it will feedback "AV01 to 02".

6、Transfer signals from an input channel to corresponding output channel: [x]#.

Example: "5#." to transfer signals from the input5 to the output5.

7、Switch off an output channel: [x]$.

Example: "5$." to switch off the output 5.

8、Switch signal: [x1] B[x2].

Example: "12B12,13,15." to transfer signal from the input12 to the output No.12,13,15.

9、Inquire the input channel to the output channel [x]: Status[x].

Example: Send "Status3." to inquire the input channel to the output 3.

10、Inquire the input channel to the output channels one by one: Status.

Example: "Status." to inquire the input channel to the output channels one by one.

11、Save the present operation to the preset command [Y]: Save[Y].

Example: "Save7." to save the present operation to the preset command No.7.

12、Recall the preset command [Y]: Recall[Y].

Example: "Recall5." to recall the preset command No.5.

13、Clear the preset command [Y]: Clear[Y].

Example: "Clear5." to clear the preset command No.5.

14、EDID management command:. EDIDM[X]B[Y].

Example: "EDIDM5B3." to enable input 3 to learn the EDID data of output 5.

15、Command for signal cards: USER/[Y]/[X]***.**

Example: "USER/I/7:0623%;" to set the input 7 to support YPbPr signal, the card is plugged in the second input slot of the matrix.

4.3. TCP/IP Control (Optional)

4.3.1. Control Modes

TCP/IP default settings: IP is 192.168.0.178, Gateway is 192.168.0.1, and Serial Port is 4001. IP & Gateway can be changed as you need, Serial Port cannot be changed.

● **Controlled by Single PC**

Connect a computer to the TP port of the MMX6464, and set its IP address and gateway to the same IP section as the default IP of the MMX6464 (192.168.0.178).

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 0 . 227

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 0 . 1

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 202 . 96 . 134 . 133

Alternate DNS server: 202 . 96 . 128 . 68

☐ Validate settings upon exit

Advanced...

OK   Cancel

Same IP as the switcher

● **Controlled by PC(s) in LAN**

The MMX6464 can be connected with a router to make up a LAN with the PC(s), this make it able to be controlled in a LAN. When control, just make sure the MMX6464's IP section is the same with the router. Please connect as the following figure for LAN control.
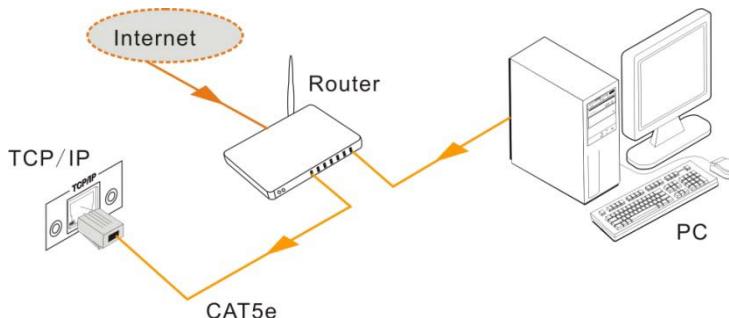
Step1. Connect the TCP/IP port of the MMX6464 to Ethernet port of PC with twisted pair.

Step2. Set the PC's IP address and gateway to the same IP section as the MMX6464. Do please remember the PC's original IP address and gateway.

Step3. Set the MMX6464's IP address and gateway to the same IP section as the router.

Step4. Set the PC's IP address and gateway as the original one.

Step5. Connect the MMX6464 and PC(s) to the router. In the same LAN, each PC is able to control the MMX6464 asynchronously.

4.3.2. TCP/IP Settings

Step1. Connect the TCP/IP port of the MMX6464 to Ethernet port of PC with twisted pair.

Step2. Set the PC's IP and gateway to the same IP section as the default IP of the MMX6464 (192.168.0.178).

Step3. Enter the http://192.168.0.178:100 to the Internet Explorer, you will see the LOGIN page.

Step4. Enter user name "admin" and password "admin", then press the **Enter** button. (Not the Enter key on your keyboard.) Then you can enter the configuration page to configure the IP port, including the IP reset, Serial reset and password reset etc. As picture below:
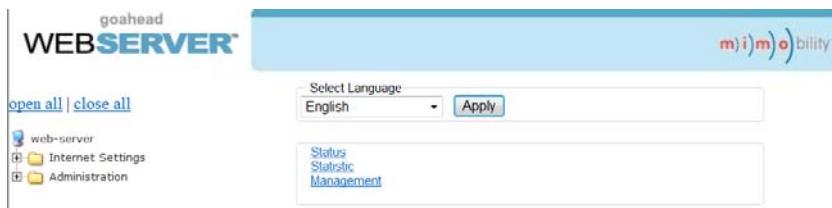
Step5. **Change IP/Serial Port**

- **Change IP**
- **a)** Select the tab "**system info**", and then you are able to change the IP.

- **b)** Press the button **Apply** to save your settings. Then the PC(s) in this LAN (connected with this router) will be able to control the matrix switcher.

- **Change Serial Port**
- **a)** Select the tab "**serial info**", and then you are able to change the serial port.
- **b)** Set the port number to 4001 (unique, other numbers are unavailable).
- **c)** Press the button **Apply** on present page to save your settings.

Step6. Select the tab "**reset device**", then your settings will be loaded to the MMX6464.

5. Specification

5.1. Main Unit

Control parts			
Serial control port	RS-232, 9- female D connector	Configurations	2 = TX, 3 = RX, 5 = GND
Installation	Rack Mountable	Front panel control	Buttons
Options	TCP/IP control		
General			
Power Supply	100VAC ~ 240VAC,	Power	550W (Max)

	50/60Hz	Consumption	
Temperature	-10 ~ +40℃	Humidity	10% ~ 90%
Dimension (W*H*D)	483 x 438 x 320mm (10U high)	Weight	8Kg

5.2. Changeable Cards

5.2.1. 4I-DV & 4O-DV

Input		Output	
Input	4 DVI	Output	4 DVI
Input Connector	Female DB24+5	Output Connector	Female DB24+5
Input Level	T.M.D.S. 2.9V~3.3V	output Level	T.M.D.S. 2.9V~3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI 1.0/HDMI 1.3 full digital T.M.D.S signal	Switching Speed	200ns (Max.)
Max Time-delay	5nS (±1nS)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards		

5.2.2. 4I-DS & 4O-DS

Input		Output	
Input	4 DVI	Output	4 DVI
Input Connector	Female DB24+5	Output Connector	Female DB24+5
Input Level	T.M.D.S. 2.9V~3.3V	output Level	T.M.D.S. 2.9V~3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI,HDMI,VGA,C-VIDEO,YPbPr	Switching Speed	200ns (Max.)
Max Time-delay	5nS (±1nS)	Crosstalk	<-50dB@5MHz

EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards

5.2.3. 4I-HD & 4O-HD

Input		Output	
Input	4 HDMI	Output	4 HDMI
Input Connector	Female HDMI	Output Connector	Female HDMI
Input Level	T.M.D.S. 2.9V/3.3V	output Level	T.M.D.S. 2.9V/3.3V
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	6.75Gbit/s
Video Signal	DVI 1.0/HDMI 1.4a full digital T.M.D.S signal	Max Time-delay	5nS (±1nS)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with HDCP using DVI and HDMI 1.4a standards		

5.2.4. 4I-VG & 4O-VG

Input		Output	
Input	4 VGA	Output	4 VGA
Input Connector	Female 15 pin HD	Output Connector	Female 15 pin HD
Input Level	0.5 ~ 2.0Vp-p	Output Level	0.5 ~ 2.0Vp-p
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	0 dB	Bandwidth	350MHz (-3dB), fully load
Video Signal	VGA-UXGA, RGBHV, RGBS, RGsB, RsGsBs, component video, S-video & C-video.		
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

5.2.5. 4I-VA

Input			
Video		**Audio**	
Input	4 VGA	Input	4 Stereo Audio
Input Connector	Female 15 pin HD	Input Connector	3P Captive connector
Input Level	0.5 ~ 2.0Vp-p	CMRR	>90dB @20Hz ~ 20KHz
Input Impedance	75Ω	Input Impedance	>10K Ω
General			
Gain	0 dB	Bandwidth	YPbPr:170MHz; C-video:150MHz; VGA:170MHz
Video Signal	VGA-UXGA, RGBHV, RGBS, RGsB, RsGsBs, component video, S-video& composite video.		
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

5.2.6. 4I-SD & 4O-SD

Input		Output	
Input	4 SDI	Output	4 SDI
Input Connector	Female BNC	Output Connector	Female BNC
Input Level	0.8Vp-p ± 10%	output Level	0.8Vp-p ± 10%
Input Impedance	75Ω	Output Impedance	75Ω
General			
Gain	Unity	Maximum Data Rate	2.97 Gbps
Transmission Distance	300M (Max.)	Data rate Lock	Auto
Input Return Loss	<-14 dB @ 1 MHz ~ 1.5 GHz	Input Return Loss	<-14 dB @ 1 MHz ~ 1.5 GHz
Video Standard	SMPTE 292M, SMPTE 259M, SMPTE 424M, ITU-RBT.601, ITU-RBT.1120	Data Type	8bit, 10bit
Audio Bits per Sample	18 bits per channel, 2 channels (L, R)		

5.2.7. 4I-TP & 4O-TP

Video Input		Video Output	
Input	4 RJ45	Output	4 RJ45
Input Connector	Female RJ45 3.5mm mini jack for IR 3 poles captive screw connector for RS232	Output Connector	Female RJ45 3.5mm mini jack for IR 3 poles captive screw connector for RS232
Input Impedance	75Ω	Output Impedance	75Ω
Video General			
Gain	0dB ~ 10dB@100MHz	Bandwidth	6.75Gbps
Resolution range	800x600 ~ 1920x1200	Transmission Distance	70M(Max)
SNR	>70dB@ 100MHz-100M	Return Loss	<-30dB@ 5KHz
THD	＜0.005%@1KHz	Min.～Max. Level	＜0.3V ~ 1.45Vp-p
HDMI Standard	Support HDMI1.4a and HDCP	Differential Phase Error	±10° @ 135MHz_100M

5.2.8. 4I-UH & 4O-UH

Input			
Video Input		Audio Input	
Input	4 HDMI	Input	4 Analog
Input Connector	Female HDMI	Input Connector	3.5mm pluggable terminal block
Min.～Max. Level	T.M.D.S. 2.9V~3.3V	Input Impedance	75Ω
Input Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz
Output			
Video Output		Audio Output	
Output	4 HDMI	Output	4 Stereo
Output Connector	Female HDMI	Output Connector	3.5mm Stereo audio connector
Min.～Max. Level	T.M.D.S. 2.9V~3.3V	Output Impedance	75Ω
Output Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz

General			
Gain	0dB	Bandwidth	6.75Gbps
Max Resolution	4Kx2K	Crosstalk	<-50dB@5MHz
Transmission Distance	1080P≤70m 4Kx2K ≤ 40m	Switching Speed	200ns (Max.)
Work Temperature	-10℃～+40℃	Reference Humility	10%～90%
SNR	>70dB@ 100MHz-100M	Return Loss	<-30dB@ 5KHz
Supported Audio Format	Embedded HDMI audio: PCM, Dobly Digital, DTS, DTS-HD Analog audio: PCM		
HDMI Standard	Support HDMI1.4& DVI1.0		
EDID& HDCP Management	Compliant with HDCP 1.4; Support manual EDID management		

5.2.9. 4I-UF & 4O-UF

Input		Output	
Input	4 Fiber Optical	Output	4 Fiber Optical
Input Connector	SPF Fiber Optical Connector	Output Connector	SPF Fiber Optical Connector
Fiber Type	Multi-mode, Single mode	Fiber Type	Multi-mode, Single mode
General			
Data Rate	10.2 Gbps	Color Depth	8bit, 10bit, 12bit, 16bit
Work Temperature	0～55℃	Reference Humility	10%～90%
Optical Fiber Mode			
Connector	LC connector		
Resolution	Up to 4Kx2K		
Transmission Distance	1km (Single mode transmission, using Single Mode Optical Module and OM3 Single Mode Fiber Cable) 300m (Multi-mode transmission, using Single/ Multi mode Optical Module and OM3 Multi-Mode Fiber Cable)		
Data Rate	10.2Gbit/s		

5.2.10. 4I-BT & 4O-BT

Input				
Video Input		**Audio Input**		
Input	4 HDBT	Input	4 Stereo	
Input Connector	4 Female RJ45 (with dual-color indicator)	Input Connector	3.5mm Stereo audio connector	
Min.～Max. Level	T.M.D.S 2.9V～3.3V	Input Impedance	75Ω	
Input Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz	
Output				
Video Output		**Audio Output**		
Output	4 HDBT	Output	4 Stereo	
Output Connector	4 Female RJ45 (with dual-color indicator)	Output Connector	3.5mm Stereo audio connector	
Min.～Max. Level	T.M.D.S 2.9V～3.3V	Output Impedance	75Ω	
Output Impedance	100Ω (Differential)	Frequency Response	20Hz～20K Hz	
Control Part				
Control Signal	4 RS232	Control Connector	3-pin pluggable terminal block	
Protocol	TCP/IP			
General				
Gain	0dB	Bandwidth	6.75Gbps	
Max Resolution	4Kx2K	Crosstalk	<-50dB@5MHz	
Transmission Distance	1080P≤70m 4Kx2K ≤ 40m	Switching Speed	200ns (Max.)	
Work Temperature	-10℃～+40℃	Reference Humility	10%～90%	
SNR	>70dB@ 100MHz-100M	Return Loss	<-30dB@ 5KHz	
Supported Audio Format	Embedded HDMI audio: PCM, Dobly Digital, DTS, DTS-HD Analog audio: PCM			
HDMI Standard	Support HDMI1.4			
EDID& HDCP Management	Compliant with HDCP 1.4; Support manual EDID management			

6. Troubleshooting & Maintenance

Problems	Causes	Solutions
Output image with ghost	Bad quality of the connecting cable	Try another high quality cable
	Improper image setting of the displayer	Adjust corresponding image settings
Output image with color losing or no video signal output	Fail connection	Reconnect the displayer and the matrix
No output image when switching	No signal at the input / output end	Check with oscilloscope or multimeter if there is any signal at the input/ output end.
	Fail or loose connection	Make sure the connection is good
	The switcher is broken	Send it to authorized dealer for repairing.
IR remote does not work	Run out of battery	Change for another battery
	IR remote is broken	Send it to authorized dealer for repairing.
POWER indicator doesn't work or no respond to any operation	Fail connection of power cord.	Make sure the power cord connection is good.
EDID management does not work normally	The HDMI cable is broken at the output end.	Change for another HDMI cable which is in good working condition.
There is a blank screen on the display when switching	The display does not support the resolution of the video source.	Switch again.
		Manage the EDID data manually to make the resolution of the video source automatically compliant with the output resolution.
Static becomes stronger when connecting the video connectors	Bad grounding	Check the grounding and make sure it is connected well.

Cannot control the device by control device (e.g. a PC) through RS232 port	Wrong RS232 communication parameters	Type in correct RS232 communication parameters.
	Broken RS232 port	Send it to authorized dealer for checking.
Cannot control the device by front panel buttons while can control it through RS232 port	The front panel buttons are locked	Send command **50605%** to unlock the front panel buttons.
Cannot control the device by RS232 / IR remote / front panel buttons	The device has already been broken.	Send it to authorized dealer for repairing.

If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

7. After-sales Service

If there appear some problems when running MMX6464, please check and deal with the problems referring to this user manual. Any transport costs are borne by the users during the warranty.

1) **Product Limited Warranty:** PTN warrants that its products will be free from defects in materials and workmanship for **three years,** which starts from the first day you buy this product (The purchase invoice shall prevail).
   Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service.

2) **What the warranty does not cover (servicing available for a fee):**
   - Warranty expiration.
   - Factory applied serial number has been altered or removed from the product.
   - Damage, deterioration or malfunction caused by:
     - Normal wear and tear
     - Use of supplies or parts not meeting our specifications
     - No certificate or invoice as the proof of warranty.
     - The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
     - Damage caused by force majeure.
     - Servicing not authorized by PTN
     - Any other causes which does not relate to a product defect
   - Delivery, installation or labor charges for installation or setup of the product

3) **Technical Support:** Email to our after-sales department or make a call, please inform us the following information about your cases.
   - Product version and name.
   - Detailed failure situations.
   - The formation of the cases.

Remarks: For any more questions or problems, please try to get help from your local distributor, or email PTN at support@PTN-electronics.com.

PTN

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